ramus) is nearly twice as long as the second, which is not quite twice as long as the third joint. The adult male differs from the female in having the form slightly more slender, the third legs not widely separated from the second, and the exopods of the legs stouter, those of the third and fourth

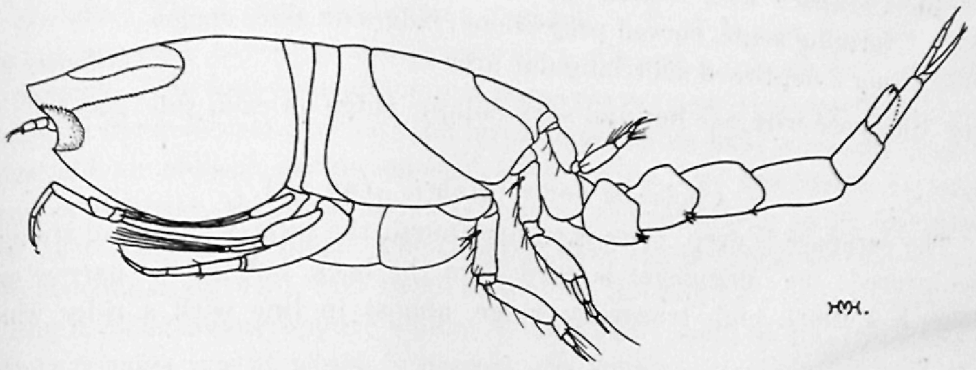

FIG. 348.—*Anchicolurus waitei* (x 30).

being well-developed. Both pairs of antennae are longer, the lash of the second being as long as the body, the spines on the uropods are more distinct, etc. The colour is pure white. Length: both sexes 3·7 mm., or $\frac{1}{7}$in. (S.A.M.)

## Family BODOTRIIDAE.

In the species here dealt with the pseudorostral lobes are short, and do not project prominently forwards beyond the eye-lobe as in the three Diastylids discussed above; three genera are represented.

a. Legs with well developed exopods on first pair only. Endopod of uropods one-jointed .. .. .. .. .. .. .. .. *Cyclaspis.*

aa. Legs with well-developed exopods on at least first three pairs. Endopod of uropods two-jointed.

b. First four pairs of legs with exopods in both sexes, those of fourth pair rudimentary in female, or in both sexes. Carapace practically smooth, without dorsal crest *Leptocuma.*

bb. First three pairs of legs with exopods in both sexes. Carapace with a distinct dorsal crest .. .. .. .. .. *Sympodomma.*

### CYCLASPIS (Sars).

The carapace is swollen and rarely slender, often approaching a globular shape, and is commonly sculptured. The first leg-bearing somite is usually indistinct, and in both sexes only the first of the pairs of legs bear exopods. The inner branch of the uropods is unjointed. This genus is well represented in tropical and southern seas, and there is no doubt that other species than the three mentioned below will be found in South Australia.

a. Carapace with two transverse ridges on back; with very strong ridges and projections, so that the dorsal outline (as seen from the side) is elevated and uneven.

b. Carapace with second dorsal carina elevated to form a pair of large curved spines behind middle of length; ridges on sides not enclosing a depressed subtriangular area . . . . . *bovis.*

bb. Carapace with second dorsal carina elevated but not forming acute, curved projections; ridges on sides enclosing a depressed subtriangular area . . . . . *tribulis.*

aa. Carapace with one low and very oblique ridge on each side *spilotes.*

*Cyclaspis bovis* (Hale). (an ox).

The carapace is deep, more than one-fourth the total length, and strongly sculptured; the integument is hard. On the back, behind the narrow eye-lobe, is a short, high transverse ridge, almost in line with a ridge which

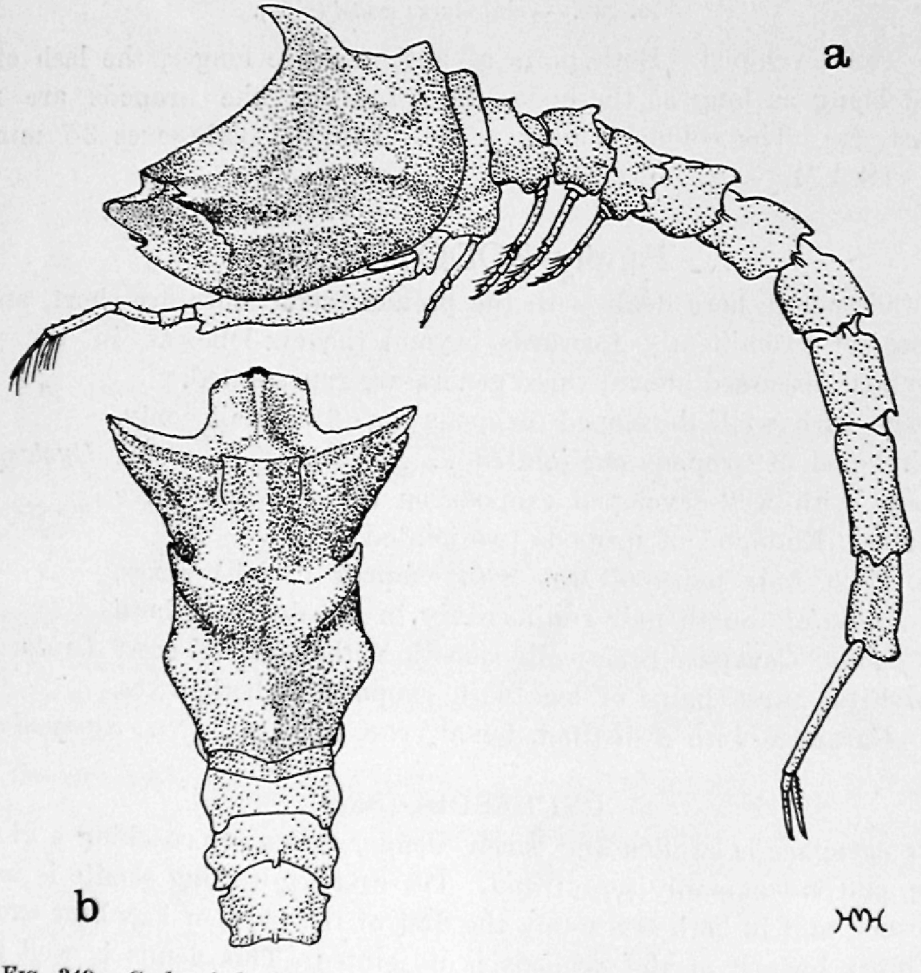


FIG. 349.—*Cyclaspis bovis*; a, side view; b, dorsal view of cephalothorax (x 8).

crosses each pseudorostral lobe and forms the dorsal edge of a deep, flattened projection on each side. A little behind the middle of length of the carapace is a pair of large flattened thornlike spines, which are connected by a median

ridge to the anterior carina. Behind these large teeth is a small median tooth or tubercle. On the sides are two low elevations and some faint ridges. The large dorsal spines are much more prominent than the anterior lateral projections when the animal is viewed from the side, but when seen from above the condition is reversed. Pseudorostral lobes just reaching to apex of eye-lobe. The second leg-bearing segment is fixed to the carapace and the last two each have a median posterior tooth and a pair of dorso-lateral projections. The first four abdominal segments are nearly square in section, each with dorso-lateral carinae; the last two segments have a median dorsal ridge and an oblique carina on each side. First legs one-fourth as long again as carapace, the basis about as long as the remaining joints together. The other legs are all short. The uropods have the peduncle as long as the fifth abdominal segment, and twice as long as the rami, which are subequal in length. The colour is pure white. Length: 19·5 mm., or ¾in. (S.A.M.)

Only females, one of which is figured, are known.

*Cyclaspis tribulis* (Hale). (a tribesman).

The carapace is about one-fourth the total length, is pitted and tuberculate, and strongly sculptured. At the base of the eye-lobe is a very short high ridge, and immediately behind this is the first large ridge, which

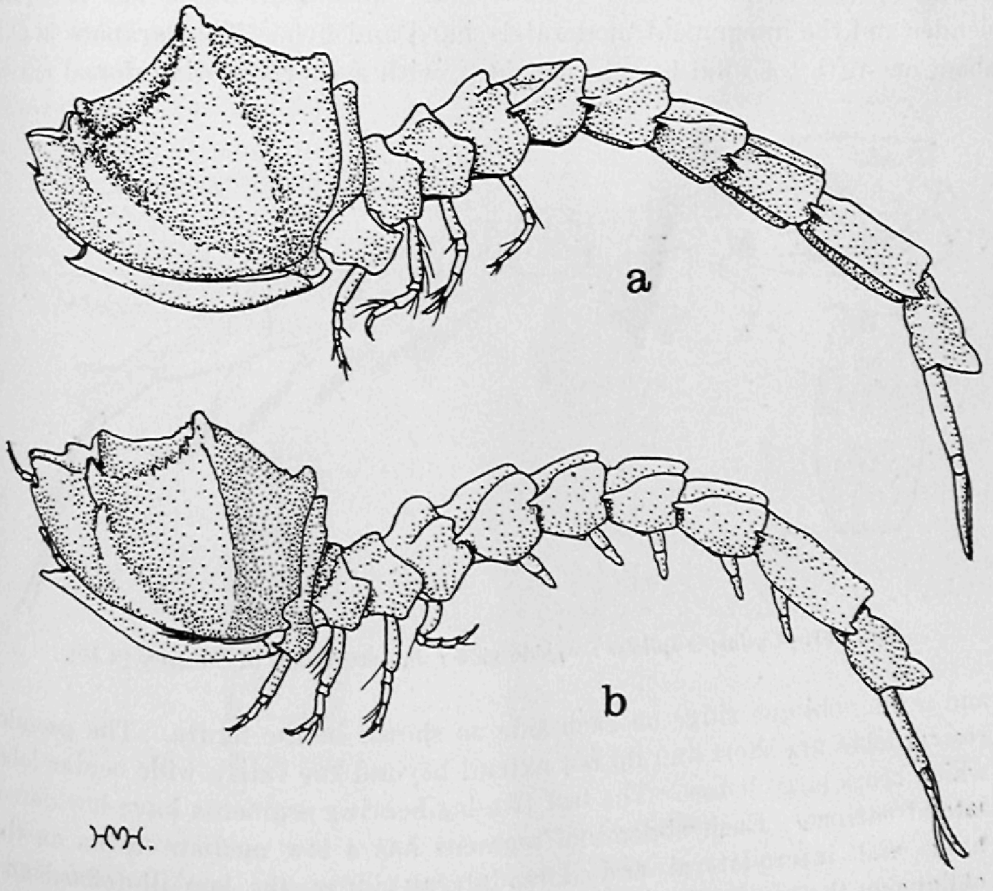


Fig. 350.—*Cyclaspis tribulis*; a, female; b, male (x 11½).

crosses the back transversely and runs obliquely down and back on the sides to meet the second large carina near the infero-posterior angle of the carapace. The first large ridge is deep and cut into five rounded lobes, one on the back and two on each side, and when viewed from the front resembles a rosette partly enfolding the animal. The second large carina is elevated dorso-laterally forming a pair of lobes, and the two ridges are connected on the back by a median carina, on each side of which is a feeble dorso-lateral crest. At the hinder end of the back is a conical elevation. The pseudorostral lobes nearly reach to the apex of the narrow eye-lobe. The last two leg-bearing segments each have a median dorsal ridge and feeble dorso-lateral elevations. Each abdominal segment has a median carina on the back, and infero-lateral and dorso-lateral carinae, the last-named almost obsolete on the last two segments. The uropods are nearly as long as the fifth and sixth abdominal segments together, and have the peduncle about as long as the subequal branches. The colour is pure white. As shown by the illustrations the sexes are much alike excepting for the usual differences; the sculpturing of the carapace is slightly less marked in the male. Length: 12 mm., or $\frac{1}{2}$in. (S.A.M.)

*Cyclaspis spilotes* (Hale). (stained or soiled).

This species is known only from a male specimen, which has the form slender and the integument moderately hard and firm. The carapace is only about one-fifth the total length, not deep, with a sharp median dorsal carina

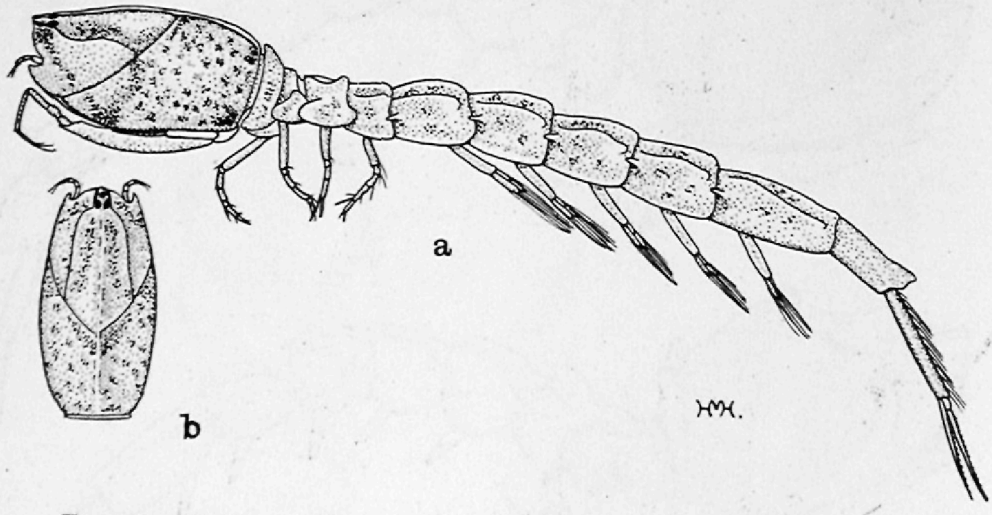


FIG. 351.—*Cyclaspis spilotes*; a, side view; b, dorsal view of carapace (x 10).

and a fine, oblique ridge on each side as shown in the figure. The pseudo-rostral lobes are short and do not extend beyond the fairly wide ocular lobe, which bears large lenses. The last two leg-bearing segments have low dorso-lateral carinae. Each abdominal segment has a low median carina on the back, and infero-lateral and dorso-lateral ridges, the last ill-defined and oblique on the last somite. The first legs are little longer than the carapace

and the basis is slightly longer than the remaining joints together. The other legs are small. The uropods are longer than the last two abdominal segments together and have the peduncle a little longer than the outer branch, which is slightly longer than the inner ramus; the inner edge of the peduncle is fringed with hairs, that of the inner branch finely serrate and armed with spines, and the inner margin of the exopod is furnished with about a dozen spines; both branches are lanceolate. The colour is pale brown, with splashings and mottlings of dark brown—hence the specific name. Length: 11 mm., or $^{7}/_{16}$in. (S.A.M.)

The type male, which is shown in the figure, was taken on a white sand bottom in St. Vincent Gulf.

## LEPTOCUMA (Sars.).

The form is slender and elongate, and the carapace is not swollen, and is almost smooth. The first leg-bearing somite is exposed only on the back, the greater part being concealed by the second thoracic segment. There are exopods on the first four pairs of legs, those of the fourth pair very small in both sexes, or in the female only. The inner branch of the uropods is two-jointed.

### *Leptocuma pulleini* (Hale). (personal name).

The sexes are much alike, but the male is a little more slender than the adult female (which is illustrated), and has five pairs of abdominal appendages. The species is very worm-like in appearance, the body being

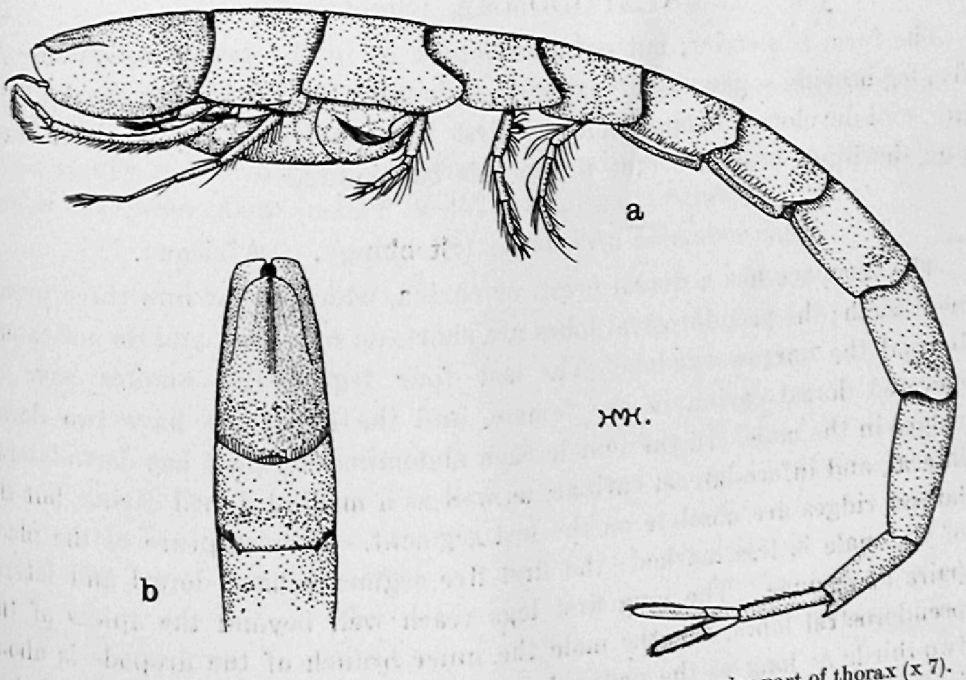


FIG. 352.—*Leptocuma pulleini*; a, side view; b, dorsal view of anterior part of thorax (x 7).

subcylindrical, very slender and tapering evenly and gradually from head to tail. The small carapace is only about one-seventh the total length, and is smooth, excepting for a very inconspicuous median ridge on the anterior part. The pseudorostral lobes are short and truncate, extending beyond the eye-lobe for a short distance, but not quite meeting in front. The eye-lobe is semicircular in shape and the eye is pigmented. The second to fifth leg-bearing somites are subequal in dorsal length, but at most only a tiny dorsal portion of the first is visible. The side-plates of the second segment overlap the first segment, and the base of the carapace, while those of the third are greatly expanded, overlapping the second somite in front and the fourth behind. The abdominal segments are long, the first two with inconspicuous infero-lateral ridges, the third with obsolete ridges. The margins of the last four leg-bearing segments and of the first four pleon segments are fringed with short adpressed bristles. The slender first legs extend beyond the apices of the pseudorostral plates, and have the basis nearly half as long again as the remaining joints. The second legs are long and slender, and the third to fifth pairs stouter and shorter and rather densely fringed with long hairs. The uropods are furnished with spines and hairs; the peduncle is nearly as long as the last abdominal segment, and nearly as long as the branches which are subequal in length; the first joint of the inner ramus is three-fourths as long as the second. The creature is cream in colour, with a faint brown bar on each body segment. Length: 24 mm., or $^{15}/_{16}$in. (S.A.M.)

## SYMPODOMMA (Stebbing).

The form is slender, but not so elongate as in the preceding genus. All five leg-bearing segments are exposed, although the first is very short. There are well-developed exopods on the first three pairs of legs in both sexes, and the inner branch of the uropods is two-jointed.

### *Sympodomma africanum* (Stebbing). (African).

The carapace has a dorsal crest, or carina, which is cut into three prominent teeth; the pseudorostral lobes are short, do not meet, and do not extend beyond the narrow eye-lobe. The last four leg-bearing somites have an elevated dorsal carina in the female, and the last three have two dorsal ridges in the male. In the female each abdominal segment has dorso-lateral, lateral, and infero-lateral carinae, as well as a median dorsal carina, but the lateral ridges are obsolete on the last segment. The sculpture of the pleon of the male is less marked; the first five segments have dorsal and lateral pairs of carinae. The long first legs reach well beyond the apices of the pseudorostral lobes. In the male the inner branch of the uropods is about two-thirds as long as the peduncle, and a little longer than the exopod, but in the female the peduncle is scarcely longer than the exopod, which is longer

than the endopod; the peduncle is carinate in both sexes, and the first joint of the endopod is about twice as long as the second. The colour of South Australian females is light biscuit brown, mottled, and spotted with dark brown. Length: 18 mm., or $\frac{3}{4}$in. (S.A.M.)

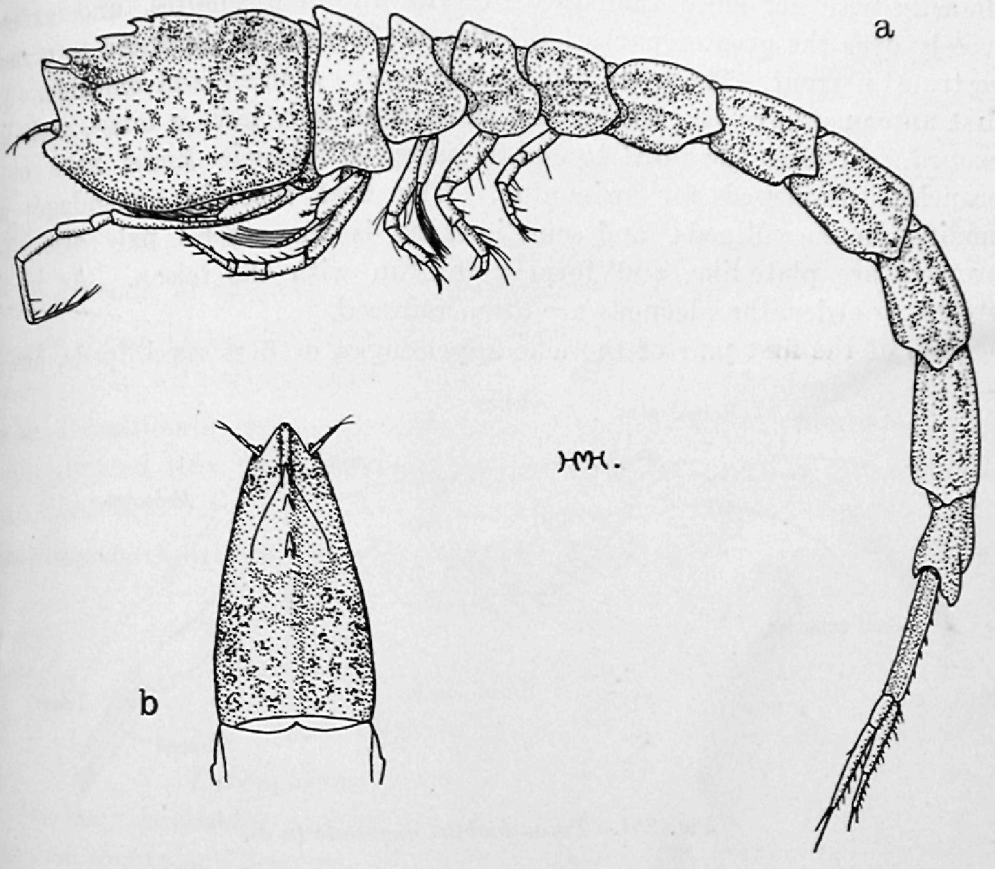


Fig. 353.—*Sympodomma africanum*; a, lateral view; b, dorsal view of carapace (x 12).

This species was originally described from a male taken off Africa. Two females have been taken in St Vincent Gulf, South Australia.

## Chapter XI.—Order MYSIDACEA. The Opossum Shrimps.

These little creatures have a shrimp-like form and exhibit, in general, the characters of the more primitive Decapoda (fig. 354). The carapace is fused dorsally with not more than three of the thoracic somites, and extends loosely over the greater part of the thorax; it may be produced to a small rostrum in front. The eyes, when present, are stalked and movable. The first antennae have two lashes, and the second pair have a large, scale-like exopod. At least the third to eighth pairs of thoracic limbs have outer branches developed for swimming. The first thoracic appendages are modified as maxillipeds, and sometimes so is the second pair also. The uropods are plate-like, and form a tail-fan with the telson. As in the preceding order, the pleopods are often reduced.

Each of the first pair of thoracic appendages, or first maxillipeds, has an

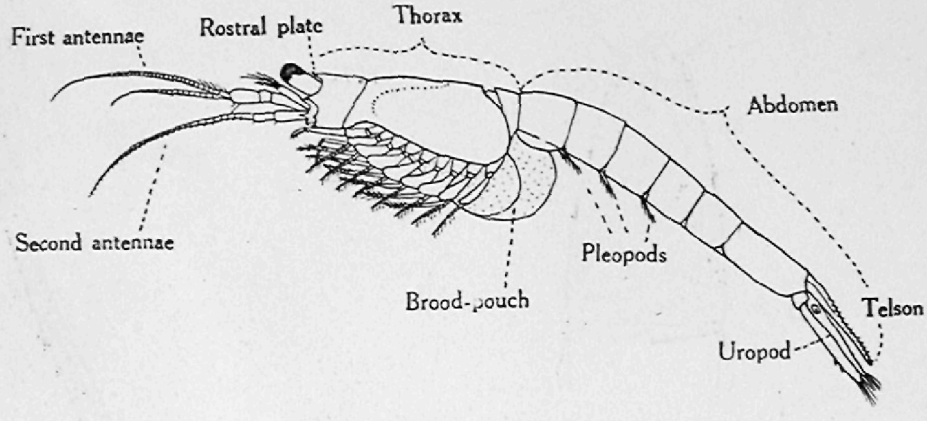


FIG. 354.—*Paranchialana angustata* (x 8).

epipod which projects backwards beneath the branchiostegite. Branched gills may be attached to the body near the articulation of the thoracic limbs.

There is an "auditory organ" in the inner branch of the uropods of most species (fig. 355, b); this consists of a comparatively large cavity, or statocyst, connected with a nerve, and containing a limy, discoidal body (statolith), which is attached to the tips of setae emanating from the bottom of the cell.

The Opossum-shrimps of South Australia have received little attention. As a matter of fact, the whole of the recorded material was collected by the writer during the last few years, and was dealt with by Dr. W. M. Tattersall, who has made a special study of this order.

*Reproduction and Development.*—The brood-pouch is formed of from two to seven pairs of oostegites or plates attached to the coxae of the legs. The young hatch at a stage corresponding to the Nauplius, and undergo the whole of the metamorphosis within the brood-pouch, relying on the protection of the mother until all the appendages are developed. The pleopods are sometimes well developed in both sexes, sometimes reduced in both; in certain families they are vestigial in the female and large in the male, and in the males of some species some of them are specially modified.

## Family MYSIDAE.

The pleopods are usually vestigial in the female but are commonly well developed in the male. The Mysidae are sometimes found crowded together in shoals, but in our waters have not yet been noted in any great number. The recorded genera may be placed in their subfamilies with the aid of the following key:—

a. Pleopods large and natatory in the male.
  b. Penultimate joint (propodus) of legs either subdivided into at least three joints or divided into two joints by an *oblique* articulation.
    c. Scale, or exopod, of second antennae very small GASTROSACCINAE.
    cc. Scale of second antennae not small, lanceolate, and with setose edges . . . . . MYSINAE.
  bb. Penultimate joint of legs either undivided or divided into two joints by a transverse articulation . . . . . SIRIELLINAE.
aa. Pleopods rudimentary in male as well as in female . . HETEROMYSINAE.

## Family GASTROSACCINAE.

### PARANCHIALINA (Hansen).

*Paranchialina angusta* (Sars). (narrow).

The body is slender and the short carapace leaves uncovered the last thoracic somite and portion of the penultimate segment; the front margin is produced medianly to form an acute triangular rostrum, on each side of which is a similar triangular projection; the antero-lateral angles are rather prominent and acute. The scale of the second antennae is small and only half the length of the peduncle of the first antennae. The terminal part of each leg is very slender and the propodus of each is subdivided into seven joints. The telson is narrow, about three and one-half times as long as its basal width; the apex is cleft by a deep, narrow incision, and the two terminal lobes thus produced are each tipped with a spine which is longer than the spines fringing the lateral margins and the edges of the cleft. The branches of the uropods are subequal in length and are fringed with feathery hairs; the inner edge of the inner branch is armed with numerous unequal spines arranged in irregular series; the outer branch has only two spines, situate at about the middle of the length of the outer margin. The first three pairs of pleopods of the female are styliform, the last two pairs broad and short. The first and last pleopods of the male are uniramous. Length: 10 mm., or $\frac{2}{5}$in. (S.A.M.)

This species and *Australomysis incisa* were originally found in Port Phillip, but also occur in South Australian seas.

## Subfamily MYSINAE.

Three genera are represented:

a. Telson entire, not cleft apically.

b. Telson long. Outer branch of fourth pleopod of male with more than one apical bristle . . . . . *Leptomysis.*

bb. Telson short. Outer branch of fourth pleopod of male with only one apical bristle . . . . . *Anisomysis.*

aa. Telson cleft, the cleft armed with teeth . . . . . *Australomysis.*

### LEPTOMYSIS (Sars).

*Leptomysis australiensis* (Tattersall). (Australian).

The short carapace leaves the last thoracic segment completely uncovered and is produced in front to a large subtriangular rostrum with the apex narrowly rounded. The scale of the second antennae is narrow and very long, eight times as long as broad, and extends for half its length beyond the peduncle of the first antennae. The legs are robust, with the propodus subdivided into three or four joints. The telson is tongue-shaped, twice as long as its width at base, with the apex rounded and not cleft; the margins are armed with many closely-set spines not arranged in series, and there is a pair of slightly longer spines at the extreme apex. The inner branch of the uropod is one-fourth as long again as the telson, has a blunt, spine-like dorsal projection on the statocyst, and a row of spines (four of them on the statocyst) ventrally; the outer branch is one-third as long again as the inner. The outer branch of the fourth pleopod of the male is longer than the inner, has two long, stout apical setae on the last joint, and a single strong bristle on each of the three preceding joints. Length: 12 mm., or ½in. (S.A.M.)

### ANISOMYSIS (Hansen).

*Anisomysis australis* (Zimmer). (southern).

The front margin of the carapace is not markedly produced and is very obtusely angular. The scale of the second antennae is eight times as long as broad; in the female it extends slightly beyond the apex of the peduncle of the first antennae, and in the male reaches for the length of its very short second joint beyond the end of this peduncle. The short tongue-shaped telson reaches only a little beyond the statocyst of the uropod, is three-fourths as wide as long, and bears ten to thirteen short spines on the posterior half of each lateral margin. The outer branch of the uropod is longer than the inner, which is more than twice as long as the telson. The outer branch of the fourth pleopod of the male is very elongate, with an apical bristle on each of the last two joints, and the inner branch is rudimentary. Length: 6 mm., or ¼in. (S.A.M.)